

LISTING OF THE CLAIMS

Claims 1 to 6: (canceled).

7 (new): A method of production of high strength galvannealed steel sheet excellent in workability comprising:

finish rolling a slab containing, in mass, C: 0.05 to 0.15%, Si: 0.3 to 2.0%, Mn: 1.0 to 2.8%, P: 0.03% or less, S: 0.02% or less, Al: 0.005 to 0.5%, and N: 0.0060 or less, and a balance of Fe and unavoidable impurities where, when %C, %Si, and %Mn respectively represent the C, Si, and Mn contents, $(\%Mn) / (\%C) \geq 12$ and $(\%Si) / (\%C) \geq 4$ being satisfied, said finish rolling taking place at a temperature of at least an Ar3 point to provide a hot rolled steel sheet,

cold rolling the hot rolled steel sheet by a reduction rate of 50 to 80%,

then annealing the cold rolled steel sheet in a continuous hot-dip galvanizing facility in a 700°C to 850°C ferrite and austenite two-phase temperature region prior to hot-dip galvanizing,

cooling the annealed steel sheet from its maximum peak temperature to 650°C by an average cooling rate of 0.5 to 10°C/sec, then from 650°C to 500°C by an average cooling rate of 3°C/sec or more,

holding the cooled annealed steel sheet in a temperature range of 500°C to a hot-dip galvanizing bath temperature for 30 seconds to 240 seconds prior to hot-dip galvanizing in the hot-dip galvanizing bath,

then hot-dip galvanizing said steel sheet in said hot-dip galvanizing bath so as to form on the surface of said cold rolled steel sheet a hot-dip galvanizing layer,

then alloying said steel sheet with said hot-dip galvanizing layer so as to produce a galvannealed steel sheet comprised of said steel sheet having

on its surface a galvannealed layer containing Al: 0.05 to 0.5 mass % and Fe: 5 to 15 mass% and a balance of Zn and unavoidable impurities, said steel sheet satisfying a relationship of tensile strength F (MPa) and elongation L(%) of $L \geq 52 - 0.035 \times F$,

said method of production of high strength galvannealed steel sheet excellent in workability further comprising performing said hot-dip galvanizing in a hot-dip galvanizing bath of a composition of ingredients comprised of an [Al%] concentration in the bath of 0.07 to 0.105 mass% and a balance of Zn and unavoidable impurities and performing said alloying at a temperature T (°C) satisfying,

$$225 + 2500 \times [Al\%] \leq T \leq 295 + 2500 \times [Al\%],$$

where, [Al%]: effective Al concentration, in mass%, in said hot-dip galvanizing bath, effective Al concentration being the value of the Al concentration in said hot-dip galvanizing bath minus the Fe concentration in said hot-dip galvanizing bath.

8 (new): A method of production of high strength galvannealed steel sheet excellent in workability according to claim 7, wherein [Al%] in the hot-dip galvanizing bath satisfies; $[Al\%] \leq 0.103 - 0.008 \times [Si\%]$,

where, [Si%]: Si content in the steel sheet.

9 (new): A method of production of high strength galvannealed steel sheet excellent in workability according to claim 7 or 8, wherein a time after hot-dip galvanizing coating until cooling to 400°C or less is 10 seconds to 100 seconds.

10 (new): A method of production of high strength galvannealed steel sheet excellent in workability according to claim 7 or 8, wherein the temperature of the hot-dip galvanizing bath is less than 460°C.

11 (new): A method of production of high strength galvannealed steel sheet excellent in workability according to claim 7 or 8, wherein the annealed steel sheet is

cooled to 450°C or less, then the cooled steel sheet is reheated to said holding step temperature range and then the reheated steel sheet is hot-dip galvanized.

12 (new): A method of production of high strength galvannealed steel sheet excellent in workability according to claim 7 or 8, comprising annealing the cold rolled steel sheet in a continuous hot-dip galvanizing facility in a 700°C to 850°C ferrite and austenite two-phase temperature region prior to hot-dip galvanizing,

cooling the annealed steel sheet from its maximum peak temperature to 650°C by an average cooling rate of 0.5 to 10°C/sec, then from 650°C to 500°C by an average cooling rate of 3°C/sec or more,

holding the cooled annealed steel sheet at a temperature range from 500°C to a hot-dip galvanizing bath temperature for 30 seconds to 240 seconds prior to hot-dip galvanizing in the hot-dip galvanizing bath,

then further cooling the held steel sheet to below 450°C, and

then reheating the cooled steel sheet to a temperature over 450°C, then hot-dip galvanizing said steel sheet in said hot-dip galvanizing bath.